Meet John Myers
Sandia’s Senior Director for HR and Communications brings an upbeat attitude to work every day.

Charting new routes to renewables

Sandia speeds transformation of biofuel waste into wealth
By Jules Bernstein

A Sandia-led team has demonstrated faster, more efficient ways to turn discarded plant matter into chemicals worth billions. The team’s findings could help transform the economics of making fuels and other products from domestically grown renewable sources.

Lignin, the tough material left over from biofuel production, contains compounds that can be converted into products like nylon, plastics, and drugs. It is one of the main components of plant cell walls, and gives plants structural integrity as well as protection from microbial attacks.

Products made from converted lignin could subsidize biofuel production, making the cost of biofuels...

(Continued on page 4)

HADES uses alternative reality to mislead hackers
By Neal Singer

THE NOVELIST Fyodor Dostoevsky once postulated that the devil no longer employs fire and brimstone but instead simply tells you what you want to hear.

Cyber researchers Vince Urias, Will Stout, and Caleb Loverro move with that second option when it comes to foiling a hacker. Rather than simply excising a discovered intruder, they deploy a recently patented alternative reality, aptly dubbed HADES (High-fidelity Adaptive Deception & Emulation System), which feeds a hacker not what he needs to know but what he wants to believe. HADES has just won a 2017 R&D 100 Award presented annual by R&D Magazine.

“Deception is the future of cyber defense,” says Vince. “Simply kicking a hacker out is next-to-useless.”

(Continued on page 4)

Sandians take home five R&D 100 Awards

The winners of the 55th annual R&D 100 Awards — an international competition that recognizes the 100 most exceptional innovations in science and technology from the past year — were announced Nov. 17. The R&D 100 Awards have long been considered the most globally prestigious recognition of invention and innovation.

Here are the five Sandia recipients:

• HADES: The High-Fidelity Adaptive Deception & Emulation System
• Ultra-Wide-Bandgap Power Electronics
• The Microgrid Design Toolkit (MDT)
• SolidSense Gas Analyzer (with the University of New Mexico)
• Control System for Active Damping of Inter-Area Oscillations (with Montana Tech and the Bonneville Power Administration)

— Details in the next Lab News

IEEE Fernbach award . . . 9
Supercomputer honors . . . 9
Making strides with small business . . . . . . . . . . . . . . . 5
I’ve had security on my mind lately. And safety too, for that matter. I’ll get to the reasons why down below.

We’ve all seen over the past couple of years how the security measures in our day-to-day work environments have changed.

Bob’s DBIDS identification system – implemented at bases around the world – aims to give the military a better handle and more control over who is coming and going in its facilities. It has complicated life for some of us at Sandia as it requires us to jump through extra hoops to bring visitors into our worksites. But if one can set aside for a moment the minor, albeit inconveniencing, details, it makes a lot of sense.

When I first started at Sandia, base access was as simple as having a decal on your windshield; that was all the base pass you needed. That was a more trusting time – probably too trusting if you get right down to it. But let’s face it – given that the Air Force does on this base, it ought to be hard to get on the site.

9/11 was a wake-up call as far as base access was concerned. Security was tightened immediately and has evolved over the years to meet the perceived threat.

Meanwhile, at Sandia we’re dealing with an almost mind-boggling escalation of the potential threats we face, threats that didn’t exist a generation ago. All of us have been impacted in various ways – for example, the requirement that we use smart card authentication to access our computers is a new development. It’s a bit harder to say that, maybe, but given the stakes, is it a reasonable requirement? Seems so to me.

I don’t need to go into the details about what we’re dealing with – we’ve all read about the cyberattacks against both the private sector and government computer systems. We’ve all read about how our personal information has been compromised. It’s not so much just about the money – even more likely, that we could have avoided being victims.

Lesson one is that had we taken some common sense measures years ago, it’s possible, even likely, that we could have avoided being victim. Lesson two is that if you keep your门 and credit cards are hard to steal whatever you do.

After an unfortunate first-hand experience, I’ve come to a new appreciation of the need for security. I’ll never grope again about what our security at Sandia and 844-787-3000 say to the other guy to protect us and allow us to work. Last week, my wife and I were the victims of a home invasion. That’s a strong word, but I don’t really know how else to describe it. They literally kept us up for hours.

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I interviewed Sandia master safe technician Steve Highland a couple of years back and he made the point that every safe is eventually beatable; safe locks are just meant to make it take so long it takes the invader to breach one, how much time it buys you to catch the bad guy. Likewise with home security. You probably can’t make your home break-in proof, but you can certainly make it harder for the bad guy to do so.

My attitude was always that home invasions were something that happened to someone else. Not so. It happened to me and could well happen to you. So please, as a holiday gift to you and your family, do the research, make the investment, and protect what’s important to you. I’m already sleeping better and I’ll bet you will too.

See you next time.

– Bill Murphy


Sandra National Laboratories
Albuquerque, New Mexico 87185
Livermore, California 94550


LabNews rack locations

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The Lab News is delivered to newspaper racks in the locations listed below every other Thursday afternoon.
As residents in Northern California adjust to life after one of the state’s most devastating wildfires, many of them still lack the necessities to stay warm as the cold months approach.

To help meet this need, Sandia/California employees donated more than 200 coats to assist our northern neighbors as part of the Sandia Gives campaign in partnership with One Warm Coat, a San Francisco-based nonprofit that provides those in need with free warm coats.

Krissy Galbraith from Sandia’s California Communications group spearheaded the coat drive once again for the California site. This was Krissy’s sixth annual coat drive at Sandia and her 12th overall on behalf of One Warm Coat.

Fierce winds in October drove flames that killed at least 43 people and destroyed 8,900 houses and other buildings across Northern California.

“We decided to donate the coats collected from this year’s One Warm Coat drive to residents in Northern California,” says Krissy. “The devastation of last month’s fire really hit close to home, and it was obvious our neighbors would greatly need the coats.”

In addition to the 200-plus coats, Sandia/California workforce members donated hats, scarves, blankets, and bedspreads during this year’s Sandia Gives coat drive.

Other nonprofit organizations register with One Warm Coat to receive coats. This year, Sandia’s contributions to One Warm Coat will be distributed by Redwood Gospel Mission in Santa Rosa, California, during its Thanksgiving event, which is expected to host up to 5,000 people.

SANTA ROSA STRONG — Community residents show resilience in wake of fire.

SANDIA BUSINESS DEVELOPMENT and licensing specialist Rachel Wallace donated 23 coats to Sandia/California’s One Warm Coat drive.

KRISNY GALBRAITH, left, delivered more than 200 coats to Redwood Gospel Mission in Santa Rosa, California.
Biofuels

more competitive with petroleum. Unfortunately, lignin’s toughness also makes it difficult to extract its valuable compounds. Scientists have wrestled for decades with deconstructing it. As a result, lignin often sits unused in giant piles.

Sandia bioengineer Seema Singh and her team have demonstrated two new routes to lignin conversion that combine the advantages of earlier methods while minimizing their drawbacks. The team’s recent findings are described in the journal Scientific Reports.

We basically skipped three-quarters of the steps we were doing previously by engineering the plant to grow intermediate chemicals.

A chemical/biological hybrid path forward

To break the bonds between compounds that make up lignin, scientists have either employed chemical or biological methods. The gentler biological methods do enable the produc-

tion of specific targeted compounds. But to fully break down lignin using this approach can take weeks or even months.

Conversely, harsh chemicals can deconstruct lignin in hours or even minutes. But this method requires expensive catalysts and is sometimes toxic, and there-

for unsustainable. Worse, chemical methods lead to a mix of compounds that each appear in extremely small quantities.

“You get a little bit of a whole lot of various chemi-

cals when you break down lignin this way,” Seema says. “The quantities yielded are not terribly useful.”

Her team has demonstrated two new techniques that incorporate the speed of a chemical method and the precision of a biological one. In both cases, Seema’s team ultimately produced high-value chemicals that currently are derived only from petroleum: muconic acid and pyrogallol.

Muconic acid can easily be turned into nylon, plas-
tics, resins or lubricants, and pyrogallol has anti-cancer applications. Together, Seema reports these chemicals have a combined market value of $255.7 billion.

“Muconic acid is what we call a platform chemical. From there, creating new products is really just a matter of imagination,” she says.

Bioengineering further shortens the conversion process

The team’s first new conversion method is a multi-

stage process that begins by pre-treating lignin with a compromising signal that is both challenging and evolving, enables cyber security professionals to better defend their networks from current attacks, learn their attacker’s methods and motives, potentially identify their attackers, and increase the adversary’s “work fac-

tor”—the time and resources the adversary must expend to successfully breach a cyber system. In an era of increasing sophistication among cyber crimi-
nals and state-sponsored threat actors, HADES could lead to a dramatically improved cyber secu-

rity posture for American enterprises.

Hybrid methods key to future efforts

Sandia funded the majority of the work on this pro-

ject through its Laboratory Directed Research and Development program. The tobacco plant engineering work was done by Seema’s collaborators from the feed-

stock division at the Joint BioEnergy Institute in Emeryville, California, including Dominique Luque and Aymeric Eudes.

Seema directs the biomass pretreatment program at the institute, which is staffed by scientists from a consorti-

um of laboratories including Lawrence Berkeley National Laboratory. She says she believes future research into integrated chemical and biological pathways could be heavily influenced by her team’s demonstrations.

“The biggest challenge in this field will be further maximizing the efficiency of these biological pathways, and the rate at which they can be yielded. “Everyone under-

stands that hybrid approaches are key to lignin valoriza-

tion,” Seema says.

Industrial adoption of this technology will depend on the ability to quickly produce large amounts of high-

value product. “If you can only make milligram amounts in a month from a bug, that just won’t cut it,” Seema says. “You want the organisms to make kilograms amounts in less than an hour, ideally.”

About HADES

From Sandia’s Intellectual Property website

Until now, no single, integrated suite of tools has provided a comprehensive solution for detecting, deceiving, engaging, and analyzing the cyber adversary. HADES provides analysts the ability to isolate an attack while collecting raw intelligence about threat actors and their tools, tactics, and procedures. This increased awareness, and the ability to adjust the deception environment to provide the attacker with a realistic environment that is both challenging and evolving, enables cyber security professionals to better defend their networks from current attacks, learn their attacker’s methods and motives, potentially identify their attackers, and increase the adversary’s “work fac-

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“A hacker informing his boss that he’s discovered a problem doesn’t do his reputation much good, he’s discredited.”

A hacker informing his boss that he’s discovered a prob-

lem doesn’t do his reputation much good, he’s discred-

ited. And then the adversary must check all data ob-

tained from us, because they don’t know when we were talking.

Furthermore, when a hacker finally puzzles out that something is wrong, he must display his toolkit as he tries to discern truth from fiction.

“It used to be that technologically we couldn’t move a visitor to a different reality without them knowing,” says Vince, “but there’s been a radical change in net-

working in the last 15 to 10 years, from hardware to software. With the ephemeralness of the network fabric, I can change realities without a hacker knowing.”

Adversaries want data that helps their situational awareness. “But when we change data in our fake world, we devalue information and set up eventual inconsistencies.”

To do this, he says, “We move to another location in the Cloud and build a slightly different world around them. Our intent is to introduce doubt. If they get some-

thing, is it real or is it fake? The worst horror for an adversary is the identical world, but changed. Can we introduce more work for them?”

HADES can operate in multiple modes, says Vince, from a small organization without resources to a large company. The Department of Homeland Security’s Cyber Security Division has worked with Sandia on deployment.

Like any technique, HADES has its limitations. While the simplest deceptive environment can be instantiated on a small private computer, environments of greater fidelity require more CPU and memory resources, and may thereby reduce the number of virtual environ-

ments deployable on a single server. What the IT and cybersecurity communities want, he says, is what he wants: “To stop the [information] bleed-

ing and get actionable intelligence: What is an adversary looking for, what did they get, and how did they get it?”

The technique has allowed the researchers to locate malware an adversary has placed in a system, and is capable of active attack.

HADES sows confusion among hackers

(Continued from page 1)

“HADES has provided a comprehensive solution for detecting, deceiving, engaging, and analyzing the cyber adversary. HADES provides analysts the ability to isolate an attack while collecting raw intelligence about threat actors and their tools, tactics, and procedures. This increased awareness, and the ability to adjust the deception environment to provide the attacker with a realistic environment that is both challenging and evolving, enables cyber security professionals to better defend their networks from current attacks, learn their attacker’s methods and motives, potentially identify their attackers, and increase the adversary’s “work fac-

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(Continued from page 1)
Making strides with small business
Supplier open houses in first year create partnerships between Sandia, businesses

By Manette Newbold Fisher
Photos by Randy Montoya

ost Sandia employees probably haven’t wondered where the office products on their desks came from, but if they were to follow the supply chain, they just might find a story behind those pens and binders.

All Schneider pens, for example, come from Stride, Inc., an Albuquerque company where some employees with disabilities take long bus rides to work, and then pack, assemble, and ship those supplies. Their bosses watch for them to arrive every day, embrace them with smiles, ask how they’ve been, then give them responsibilities in quality assurance, shipping, and receiving.

For years the small business has made its mission to hire people with special needs to manufacture products, some of which find their way to another Albuquerque-based business, Sandia Office Supply, the Lab’s office supplier. Recently Stride president and CEO Kerry Bertram turned to Sandia’s open house for businesses to figure out how to get more products made by its workers into the hands of the Lab’s workforce.

In the year since Sandia created open houses for businesses, more than 300 visitors from more than 260 companies have sought to learn more about doing business with the Labs, says supplier diversity advocate Eric Loehausen. Bertram was one of these visitors. She talked to Sandia’s Marie Mykuzik, a supplier diversity advocate, and the conversation led to Stride getting a chance to put more of its products to use at the Labs. Helping Stride work more closely with Sandia is one example of what organizers hope the open houses achieve for the Labs and New Mexico.

Open houses are held the second Tuesday of every month in two sessions, one in the morning and one in the afternoon. The first 20 minutes are dedicated to educating visitors about working with a federal contract. The rest of the time is used for networking and matchmaking sessions, where business owners can speak with subcontract managers, supplier diversity advocates, and other Sandia personnel and members of the Small Business Procurement Technical Assistance Program.

Why Stride?

“We’ve done business with Stride for years and years and years,” says Todd Sandoval of Albuquerque’s Sandia Office Supply. “We believe the way Bertram does business and helps the Albuquerque community.

“And also the fact that they are a local manufacturer. I mean literally, they are the only local manufacturer represented in our catalog of more than 25,000 items. “When my husband and I started the business, we knew there were a lot of people with disabilities who would make good workers, and we were right,” says Stride co-founder Barbara Brennan.

During a busy September open house, Sandia’s Small Business Program manager Del Salazar spoke to visitors about how small businesses can take advantage of federal contracts.

“Each session is an opportunity to learn how to do business with Sandia,” she says. “We also invite our resource partners and offer them the opportunity to provide education as well. The feedback from our suppliers is that the education component is value added to their visit with us.”

Open houses attract a wide array of businesses, from those who don’t know how to do federal contracting to those who are very seasoned. Marie says the Small Business Procurement Technical Assistance Program or the Small Business Administration will help, and they try to make sure all questions are answered.

“I believe the greatest success is providing small, local businesses the opportunity to actually meet Sandia subcontractors and supplier diversity advocates,” Eric says.

“Sandia has always seemed such a mystery for suppliers and they did not know how to initiate contact prior to the open houses.”

STRIDE INC., which employs many disabled workers, is the only local manufacturer represented in Sandia Office Supply’s catalog of more than 25,000 items. “When my husband and I started the business, we knew there were a lot of people with disabilities who would make good workers, and we were right,” says Stride co-founder Barbara Brennan.

STRIKE EMPLOYEES work on quality assurance at the small, woman-owned business in Albuquerque. Everyone who works at Stride gets paid time off and retirement, and is eligible for pay increases.

PETER packages products at Stride.

JAMES works as a shipping specialist at Stride.
Several hundred Sandians and others who work on Kirtland Air Force Base turned out Nov. 9 to celebrate Native American Heritage Month at KAFB’s Hardin Field.

The event, jointly sponsored by KAFB 377th Mission Support Group and Sandia’s American Indian Outreach Committee (AIOC), commenced with an opening prayer and greetings from Sandia Labs Director Steve Younger, NNSA Sandia Field Office Manager Jeff Harrell, and Col. Mike Harner, commander of the 377th Mission Support Group. Chris O’Gorman, senior manager in Sandia’s stockpile and systems organization, conducted a smooth program as the emcee for the event.

Entertainment was provided by Sandian Ron Hoskie, a renowned flutist who has entertained audiences around the state for many years and has long been a welcome fixture of Sandia group celebrations. The adult drum and dance performances were by Family of Southern Trail from Hogback, New Mexico, with head man Shawn James and head lady Shirlene Chee. The Little Eagle drum and dance group, made up of students from Jemez Day School and led by Malcolm Yepa, also performed.

While taking in the performances, attendees were able to enjoy traditional foods catered by Dee’s Native Grub from Tohajiilee, New Mexico.

According to event co-organizer Sherman Begay, “The Sandia/Kirtland Native American Heritage Month event was very successful thanks to the great partnership among the various resources and teams from Sandia and the base. Our goal was to celebrate and share an awareness of the deep tradition and rich culture of indigenous nations. The beautiful performances included background information to emphasize the importance of the performances. It was especially gratifying to us to watch the Little Eagles youth group perform. They proudly demonstrated that Indigenous youth will continue to protect and carry on these traditions for future generations.

“The AIOC and KAFB’s 377th Mission Support Group already look forward to next year’s celebration, which will build on this year’s successful event and turnout.”

— Bill Murphy

Photos by Randy Montoya
Sandians honored by American Indian Science and Engineering group

By Bill Murphy • Photos by Randy Montoya

S andian researcher Ginger Hernandez and Tribal Government Program Manager Laurence Brown have been honored by the American Indian Science and Engineering Society, AISES, for their career accomplishments. Ginger is the recipient of the AISES Technical Excellence Award and Laurence has received the Government Partner Service Award.

According to the AISES website, the Technical Excellence award winner is deemed to have made a significant contribution to science, engineering, or technology by having designed, developed, managed, or assisted in the development of a product, service, system, or intellectual property. Ginger is a PhD chemist who assesses emerging technologies for the Department of Energy.

The Government Partner Service award “is not lightly bestowed,” according to the notification sent to Laurence informing him of the honor. “This award is a symbol of our appreciation for your hard work and contributions to the mission of AISES. We are humbled by your passion, service, and commitment to provide opportunities for Native students interested in working in the technical arena. “Getting a STEM education can be tough and overwhelming at times, but hang in there,” she says. “Never give up. Surround yourself with positive and encouraging people. Distance yourself from toxic influences. Your efforts will be well worth it because a STEM education will provide you with endless opportunities to earn a good living doing interesting and meaningful work.”

Laurence Brown

Laurence came to Sandia in 1989. Prior to that he worked for IBM for three years in Tucson after earning his BS degree in chemical engineering from New Mexico State University.

“I came to Sandia through the One Year On Campus program and went to Stanford for my MS in materials science and engineering,” he says.

Laurence’s first job at Sandia was in the thin film and brazing department. After a one-year Entrepreneurial Leave of Absence in 1995, he returned to the same department working on cooperative research and development agreements that intersected organizations across the Labs. Since 2002, he has been with Sandia’s Government Relations organization, focusing primarily on tribal government relations and tribal energy development.

Laurence became involved with AISES in 1986 while at IBM, became a Sequoyah Fellow (lifetime member) in 1989, and continued his very active AISES involvement at Sandia.

“I was instrumental as one of the founding members, developing charters and bylaws, of the first AISES professional chapter, the New Mexico Chapter, in 1991,” he says.

Laurence served on the AISES board of directors in the mid-1990s and continued his involvement afterward as active member of the AISES Corporate Advisory Council, often along with a Sandia executive champion. He has held his current national leadership role with the AISES STEM organization, as chair or co-chair, since about 2009.

While on the Corporate Advisory Council, Laurence was instrumental in developing the AISES Professional Awards program that began in 2004. Since then, Sandia has had eight AISES Professional Award winners.

Ginger Hernandez

Ginger earned a doctorate in inorganic chemistry from Texas Tech University after receiving her undergraduate degree at the University of Central Florida. From 1980-2010, she taught chemistry part-time at Central New Mexico Community College while also working full-time at Sandia. As a volunteer with the Dream Catchers Science program, she taught concepts of physical science by making and analyzing peanut brittle and building flutes.

Ginger came to Sandia in 1994 and spent the first six years of her career managing a materials characterization laboratory. In 2008, she transferred to the Firing Set Capacitor group. “During that time, I also worked on a number of projects that supported a critical national security program for an external government customer,” she says. “That experience sparked my interest in Sandia’s work that provides data analysis and assessment to various government agencies. I wanted to be a part of that group and in the fall of 2009, I saw my opportunity — a posting for a technical analyst. Shortly after joining the Technical Assessments department, I became a team lead over a group of analysts who address evolving technical capabilities in a particularly unstable and dangerous region of the world. This is where I work today.

Ginger, whose ancestry is of mixed Anglo and Cherokee background, says that as a child she didn’t have much exposure to her Native heritage.

“My grandparents struggled with their Cherokee identity because they grew up in a time when they were afraid of being identified as native. My Granny, who has significant Cherokee blood from both her mother and her father, played down — or sometimes outright denied — her heritage. As an adult, I’m trying to piece together who I am and how I fit into my Native community.”

Ginger says she is “incredibly honored” to be chosen for the AISES award. “But more so, I’m grateful to learn about the AISES community and begin to interact with them,” she says. “I look forward to getting more involved in helping students succeed in STEM. At the 2017 national AISES conference, I learned about many resources to help encourage and develop students in STEM career paths. I wish I had known about AISES when I was in college; I could have used their support.”

Ginger has words of advice and encouragement for students interested in working in the technical arena. “Getting a STEM education can be tough and overwhelming at times, but hang in there,” she says. “Never give up. Surround yourself with positive and encouraging people. Distance yourself from toxic influences. Your efforts will be well worth it because a STEM education will provide you with endless opportunities to earn a good living doing interesting and meaningful work.”

LAURENCE BROWN, a member of the Navajo Nation, is the 2017 recipient of the Government Partner Service Award presented by the American Indian Science and Engineering Society.

“AISES has been an important part of my profession development and the network of student and professional contacts contributes to the success of my Tribal Relations work at Sandia,” Laurence says. “AISES has been and continues to be the only game in town for diversifying our talent pool with top American Indian and Alaskan Natives in STEM.”

“The AISES Government Partner Service Award means a lot to me with the recognition at the national conference that celebrated the 40th Anniversary of AISES.”

SANDIA RESEARCHER GINGER HERNANDEZ has been honored by the American Indian Science and Engineering Society with its 2017 Technical Excellence Award.

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John hit his stride at Honeywell, especially appreciating the fact that as a Fortune 50 company it had global operations, affording him the opportunity to travel and learn about cultures around the globe.

"Once I started going to different countries and experiencing their cultures, it was just fascinating to me," he says. "I really enjoyed learning and understanding why they did things the way they did them."

In those years, John's theme song could have been Johnny Cash's "I've Been Everywhere."

"When I had to get a security clearance for one of the jobs I had at Honeywell," he says, "I pulled out my old travel vouchers and realized I had been to 32 countries so far.

Favorite places in his travel log include Italy, China, and Singapore, which especially appealed to him because of its melting pot culture unified by widespread use of English as the common language.

A successful merger

One of the high points of John's Honeywell career came with his role in a successful acquisition of a satellite communications company. It was a complex deal, John says, with half the company to be merged with the Aerospace division and half to another business unit.

"It was vitally important that this merger succeed," John says. "This was a critical juncture for Honeywell Aerospace — this was important technology going forward and it really had to be done well."

John was the HR lead for the merger, a process that took almost two years to complete. "The CEO of Honeywell at the time said this was probably the best acquisition the company had ever done. I took a lot of pride in knowing that and in watching it going forward ever since — that merger has been instrumental in helping Honeywell achieve some of its strategic goals and will have a major impact on the value of Honeywell for years and years to come.

John has the move from Honeywell to Sandia to be satisfying.

"I love Sandia's values, its ethics, and integrity," he says. "Being in HR, I'm a people person. And I've found that the caliber of the people I interact with — my staff, the leadership team, and Sandians across the Labs — is just outstanding. That's what kept me at Honeywell for 20 years and that's one of the biggest things that I've really enjoyed about Sandia, the quality of the people. Their desire to make a difference. Their thoughtfulness and the concern people have for one another here."

In his role at Sandia, John says he is gratified to be part of a leadership team that will build on Sandia's legacy and leave it better and stronger than it is today.

"What I'd like to do is to continue that legacy. Our job in HR, Communications, and the Employee Health Services organization, which are the three areas that I own, is to continue to make Sandia a great place to work and a wonderful environment that allows people to use their skills to the utmost. And to make a difference that we can all be proud of."

Bucket lists and a blessed life

When John came to Albuquerque at the beginning of 2017 to begin work on the transition of the Sandia M&O contract from Lockheed Martin to NTESS, Tammy stayed behind in Phoenix to sell their home and wrap up things in Arizona. The Phoenix house sale closed in late October and the couple are now house-hunting in Albuquerque.

John and Tammy have been married for 36 years. They have four daughters and seven grandchildren — so far.

"I grew up in a family of two boys, so to go from a family of all boys to all girls was a learning experience, an adjustment," he says. "But I found it was just fun. So those are happy moments. I've been a very blessed and fortunate person.

"I try not to be a negative person or see the glass as half-empty. I'm a half-full sort of guy," he says, "because life is a great thing and we ought to embrace it and enjoy it to its fullest."

When he finds time away from work John and his wife enjoy riding their bikes and hiking in the mountains. In fact, one of his goals is to earn his private pilot's license, a process he began years ago but which has been on hold for the past eight months or so. To date, he has logged about 60 hours of flight time and a few solos, but has to complete his ground school requirements to qualify for his license.

A Detroit kid from the 1960s, John has a special affection for the Motown sound, but he enjoys jazz and soft rock, too. He enjoys reading American history, especially books about the nation's early history.

"I've found a lot of inspiration reading about Washington and Adams, Thomas Jefferson, and Abraham Lincoln. Reading about the challenges they faced and how they stayed true to their principles in their darkest hours and the great things happened because of that — those are inspiring to me."

RUGGED MANIAC — John has been active in sports since he was a kid spending his summers on the Canadian shores of Lake Erie. These days, one of his go-to athletic pursuits is competing in rugged Maniac events, which runs competitors through a several-kilometers-long obstacle course.

Another bucket list item? A trip with Tammy to Australia and New Zealand with lots of beach time tossed into the mix.

"I've had a pretty happy life," John says. "I had good parents who didn't get divorced and loved their kids. I grew up in that environment, so I had a happy childhood. I've been married to a wonderful woman for 36 years and have great kids. Having grandchildren has been wonderful. I've had some great professional experiences. S�藏ing that mission for the church for two years, not thinking of yourself and serving others — that was a wonderful, fulfilling experience. Serving others is just fun. So those are happy moments. I've been a very blessed and fortunate person.

Over the years, John has held onto that inner spark his classmates recognized in him all those decades ago.

"I try not to be a negative person or see the glass as half-empty. I'm a half-full sort of guy," he says, "because life is a great thing and we ought to embrace it and enjoy it to its fullest."

LIVESAFE

3 Safety Tips for Inclement Weather

MINDFULNESS!
Plan your walking route carefully. Avoid distractions. Use only the cleared paths and avoid walking across the snow and ice. When exiting a vehicle, move slowly, look before you step, and use the vehicle for support.

2 APPROPRIATE FOOTWEAR!
Wear footwear that has good traction with thick soles and wide, low heels. On snowy, icy, or rainy days wear boots to work and change after getting your to work location. Also, be sure to remove snow from your shoes before entering any building.

3 USE HANDRAILS!
Always use handrails when going up and down stairs.

SANDIA NATIONAL LABORATORIES

PREP YOUR STEPS
Feel free to stop "the will" to stay locations on walkways.

THE SUNNY SIDE OF THE STREET
Avoid walking on the north sides of building.
Diagnosing supercomputer problems
Sandia, Boston University win award for using machine learning to detect issues
By Mollie Rappe

A team of computer scientists and engineers from Sandia and Boston University recently received a prestigious award at the International Supercomputing conference for their paper on automatically diagnosing problems in supercomputers. The research, which is in the early stages, could lead to real-time diagnoses that would inform supercomputer operators of any problems and could even autonomously fix the issues, says Jim Brandt, a Sandia computer scientist and author on the paper.

Supercomputers are used for everything from forecast- ing the weather and cancer research to ensuring US nuclear weapons are safe and reliable without underground testing. As supercomputers get more complex, more interconnected parts and processes can go wrong, says Jim.

Physical parts can break, previous programs could leave “zombie processes” running that gum up the works, network traffic can cause a bottleneck, or a computer code revision could cause issues. These kinds of problems can lead to programs not running to completion and ultimately wasted supercomputer time, Jim adds.

Selecting artificial anomalies and monitoring metrics
Jim and Vitus Leung, another Sandia computer scientist and paper author, came up with a suite of issues they have encountered in their years of supercomputing experience. Together with researchers from Boston University, they wrote code to re-create the problems or anomalies. Then they tested the code with and without the anomaly codes on two supercomputers — one at Sandia and a public cloud system that Boston University helps operate. While the programs were running, the researchers collected lots of data on the process. They monitored how much energy, processor power, and memory was being used by each node. Monitoring more than 700 criteria each second with Sandia’s high-performance monitoring system uses less than 0.005 percent of the processing power of Sandia’s supercomputer. The cloud system monitored fewer criteria less frequently but still generated lots of data.

With the vast amounts of monitoring data that can be collected from current supercomputers, it’s hard for a person to look at and pinpoint the warning signs of a particular issue. However, this is exactly where machine learning excels, says Vitus.

Training a supercomputer to diagnose itself
Machine learning is a broad collection of computer algorithms that can find patterns without being explicitly programmed on the important features. The team trained several machine learning algorithms to detect anomalies by comparing data from normal program runs and those with anomalies.

Then they tested the trained algorithms to determine which technique was best at diagnosing the anomalies. One technique, called Random Forest, was particularly adept at analyzing vast quantities of monitoring data, deciding which metrics were important, then determining if the supercomputer was being affected by an anomaly.

To speed up the analysis process, the team calculated various statistics for each metric. Statistical values, such as the average, 5th percentile, and 95th percentile, as well as more complex measures of noisiness, trends over time, and symmetry help suggest abnormal behavior and thus potential warning signs. Calculating these values doesn’t take much computer power, and helped streamline the rest of the analysis.

Once the machine learning algorithm is trained, it uses less than 1 percent of the system’s processing power to analyze the data and detect issues.

I am not an expert in machine learning, I’m just using it as a tool. I’m more interested in figuring out how to take monitoring data to detect problems with the machine. I hope to collaborate with some machine learning experts here at Sandia as we continue to work on this problem,” says Vitus.

Vitus adds that the team is continuing this work with more artificial anomalies and more useful programs. Other future work includes validating the diagnostic techniques on real anomalies discovered during normal runs, says Jim.

Due to the low computational cost of running the machine learning algorithm these diagnostics could be used in real time, which will also need to be tested. Jim says he hopes that someday these diagnostics could inform users and system operation staff of anomalies as they occur or even autonomously take action to fix or work around the issue.

This work was funded by NNSA’s Advanced Simulation and Computing and DOE’s Scientific Discovery through Advanced Computing programs.

Sandia computational scientist Steve Plimpton receives IEEE Computer Society’s 2017 Sidney Fernbach Award
By Neal Singer

Steve Plimpton, a computational scientist at Sandia’s Center for Computing Research, has been named recipient of the IEEE Computer Society’s 2017 Sidney Fernbach Award for “high performance computer simulation frameworks that have advanced research in materials science, chemistry, biology, and other related areas.”

The citation, while accurate in scope, hardly portrays the depth of Steve’s contributions. Bill Camp, retired Sandia computational director and winner of the IEEE’s 2016 Seymour Cray computer engineering award, has written, “One cannot overstate the pioneering aspects of [Steve’s] work. He developed highly successful scalable methods in so many areas of supercomputing applications that it is hard to remember them all. He is perhaps most widely known in the science community for his work on ... molecular dynamics: His LAMMPS codes and Ecosystem are so successful that it is hard to believe that there was just one person at the core of what has become a major community spanning several scientific disciplines, from material science to chemical physics to molecular biology.”

Wrote Steve’s manager Veeva Tikear, “Steve designs computational methods and frameworks for massively parallel computing platforms ... He also builds other computational scientists to easily implement their own models ... Frameworks Steve has designed have enabled advances in modeling and simulation by entire communities of computational scientists in biology, chemistry, materials and chemical engineering, physics, and related disciplines.”

Open-source codes Steve played a major role in developing include SPARKS (modeling of materials processing at the mesoscale), and SPARTA (modeling of turbulence and flow in low-density gases). The most widely used is LAMMPS, a molecular dynamics code that has a worldwide community of thousands of users and hundreds of code contributors.

Wrote former Sandia computational director Bruce Hendrickson, “Steve ... is reflexless at a fault, always giving credit to others. Because of his broad and deep technical impact, his leadership and his service, I can think of no more deserving candidate for the Fernbach Award.”

Says Steve, “It’s an honor to be recognized for what has been the most satisfying part of my career at Sandia: helping create software tools — applications and libraries — that other people find useful for modeling science and engineering problems. That work has been a collaborative effort with many great scientists and software developers, many of whom are at Sandia. So I want to share credit for this award with all those folks who have been so enjoyable to work with over the years, many of whom have become good friends.”

“I also want to say thanks to the past and present management of our center, where I’ve spent my whole career, almost 30 years. They’ve had the vision to make high performance computing an integral part of what Sandia does, and create an environment where someone like me, who straddles physical sciences/computer science/math while being expert in none of them(), can fit in and make an impact.”

Steve was formally recognized at the SC17 Conference Awards Plenary session in Denver on Nov. 14 and presented a special invited talk at a technical session on Nov. 15.

A fellow of the American Physical Society, Steve has also been honored with a special award at the Minerals, Metals & Materials Society annual meeting for the development of LAMMPS. He received his PhD in applied and engineering physics from Cornell University in 1989.

The Fernbach award, established in 1992 in memory of HPC pioneer Sidney Fernbach, recognizes innovative approaches that produce outstanding HPC results. It is one of the highest awards of the IEEE, which has more than 423,000 members in 160 countries and according to its website “is the world’s largest technical professional organization dedicated to advancing technology for the benefit of humanity.”
Mileposts

New Mexico photos by Michelle Fleming

Recent Retirees

New Mexico photos by Michelle Fleming
MISCELLANEOUS

BREAD MAKER, West Bend, 1-1/2 lb. dough & bread, like new, $10. Locher, 296-8392.

YOUNG AT HEART DICKENS VIL-
AGE/CONCERTS, Nov. 24-
Martín, 858-5009.

DIETETTE 7-pc., w/leaf & matching hutch, maple, beau-
iful, can send photos, $65. Lopez, 401-1422.

BEDROOM, queen-size, 120" x 114", w/mirror, free standing, $250. Leehen, 505-459-4074.

FLOOR AC, for automobile, 3-
ton, low profile, used, $80. Wolfgang, 505-441-4483.

TIRE CHAIN, 1 pc., 26x10x15, $140. Goodyear Wrangler LT 265/70R18 tire, new, never used, $80. Schroeder, 917-4526.

WEIGHT BENCH, w/vegetable-
attaches, bars & weights, you
pick up, free. Brooks, 268-2038.


CORK PURSE, from Portugal, lat-
est fashion, 3½" x 14½", $9. Coro Bags, model Reja -
Havana, brass, $95. Wagner, 505-504-8783.

SNOWBOARD, 2017 Lib Tech
TRS XC2, 157 cm, intermedi-
eate, $12,900. Carlson, 505-385-5512.

BEDSPREAD, queen/king, 120"W x
114"L, w/mauve roses, hardly
beautiful, can send photos, $650. McLaughlin, 505-977-4834.

WASHER/ELECTRIC DRYER SET, Gas or electric, AC, gas cook
stove, like new, $16,300 OBO. Akin, 505-280-6594.

HOODA FIT SPORT, manual transmission, orange, aircar-
ge replaced, service records avail-
able, $450, 680 miles, $6,200.

10 HONDA FIT SPORT, manual transmis-
sion, orange, airbag
replaced, service records avail-
able, $16,000 OBO. Akin, 505-797-4834.

12 MINI COOPER COUPE
SPORT, black & red, new
tires/nms, 444 miles, super
clean, $13,800 OBO.

ELSIBACK CRANE, 1-ton. capa-
city, Harbor Freight, lightly used,
$500. Lebien, 505-459-4074.

CUSTOM BDA UTILITY TRAILER, flat bed, ~6’ x
12’, fully built, Like new, $500.

PARKING SPACE, 2017, $125.

10 HP MARINE, Honda, Electric or Manual, new, $7,000. Colgan, 344-3776.

3. Submit ad in writing. No phone-
conversations will be printed on a first-come basis.

4. Type or print ad legibly; use
computer print, preferred.

5. Submit ad on the first c
of publication unless changed by
the publisher.

6. For active Sandia members of
the Lab, the internship oppor-
tunities are free.

7. All ads must be submitted by
no later than 4 p.m. Fri.

8. No commercial ads.

9. No personal ads. 

10. Housing listed for sale is avail-
able without regard to race,
creed, color, or national origin.

11. Send name and telephone
number (If you are a
member, list club affili-
ation).

12. Use classified ads to find
friends and roommates. 

13. Free classified ads to
Announcements are
published only once.

14. Auto ads to be limited to
18 words, including last
name, first name, phone
directory & guides, $24.

NEW LISTINGS:

JACOBSON, 264-1023.

WAGNER, 505-504-8783.

WELLS, 505-292-0179.

WAGNER, 505-504-8783.

JACOBSON, 264-1023.

JACOBSON, 264-1023.

BROOKS, 268-2038.

GUTIERREZ, 505-934-2062.

LUCERO, 926-1086.

BAGGETT, 505-463-4260.

LUCERO, 926-1086.

HODGES, 505-348-1074.

WAGNER, 505-504-8783.

ARIZONA CICLONET, interest-
ally priced, $24.

JACOBSON, 264-1023.

WAGNER, 505-504-8783.

LUCERO, 926-1086.

BAGGETT, 505-463-4260.

TAYLOR, 505-280-6594.
Power of positive thinking

By Bill Murphy

I n high school, John Myers was voted class optimist by his fellow students. He wore that as a badge of honor at the time, a title to live up to, and says the description still fits to this day.

"Obvious life can be challenging but I've always tried to be a very positive person," he says. Even when things don't go as planned, John tries to see the situation in a positive light.

"We can learn from our disappointments and grow from them," he says. "They ought to not be viewed as negatives. I have a turn-lemons-into-lemonade philosophy and I've tried to be that way my entire life. I hope that people see that side of me."

John, who heads up Sandia’s HR and Communications Div. 3000, got off to a good start in life, spending his childhood in the Detroit area during the school year and, when school was out, reveling in endless summer fun at the family cottage on the Canadian side of the border on Lake Erie.

"There was a yacht club there where I took swimming and sailing lessons," he recalls. "My dad bought us a little sail boat, so I'd spend my days as a kid swimming and sailing. And there was a golf course nearby where they charged like 30 bucks for the whole summer to play as much as you wanted, so my cousins and I would golf all the time, sometimes practically from dawn to dusk."

It was a happy life. "My earliest memory is probably when I was 1 or 4 years old. I was on the front lawn of our house — me and some friends or cousins — and we were chasing my dad around, grabbing his leg and trying to tackle him and he would tickle us. So my earliest memory is of my dad and just having fun family time together."

John's father was in sales and his mother raised John and his brother at home until they grew older, at which time she took a job as an executive assistant in the local school district.

John describes himself as "an OK student. I wasn't a great student, but I wasn't a total deadbeat, either. Junior high was tough — 7th and 8th grades are just an awkward age — but I had a lot of fun in high school." John was involved in sports in high school, playing basketball and golf, and he enjoyed an active social life.

"I made a lot of friends in high school; we did a lot of things together — we'd go to dances and parties and games, things that typical high school kids do. I had good experiences."

Like all high school students, there came a time when John had to start thinking about his future. With some coaching by a guidance counselor, he figured out he was interested in either law enforcement or oceanography. "I was as far apart as they can be, I guess, but for some reason I liked both of those."

In that internal debate over which career path to pursue, law enforcement ultimately won out.

BYU and a mission to California

John had converted to the Mormon faith at age 18 and decided to go to Brigham Young University to study law enforcement with a minor in Spanish. While at BYU, he took a two-year break from school to complete a mission for the church in largely Spanish-speaking communities in California.

"I taught religious values and principles to the families in their communities for two years and became very fluent in Spanish," he says. The church mission was spiritually fulfilling but there was a corollary benefit that became apparent soon after he returned to school at BYU. "Thanks to his Spanish proficiency he met Tammy, the woman who would become his wife."

"We'd met at a park through some mutual friends," John recalls. "She's Hispanic, from Puerto Rico, and she had a letter from her grandmother written in Spanish that she couldn't read. That wasn't uncommon at that time, John notes. Hispanic kids were often actively discouraged from speaking any language other than English."

"Anyhow, she asked me to come over and translate that letter for her, in return for which she promised to make me dinner. So, free dinner, get to use my Spanish, spend some time with a beautiful young woman — what’s not to like, right? So I helped her translate the letter. She made me a delicious meatball sandwich, and it kind of went from there and we eventually got married."

Meanwhile, John graduated from BYU with his law enforcement degree and went to work as a criminal investigator for the Internal Revenue Service — the IRS — mostly in internal affairs. In that role, among his other responsibilities he investigated employee misconduct cases.

"Every year the IRS would hire hundreds of part-time, seasonal employees just to open tax returns," John recalls. "We would train them, saying ‘we’re going to test you, we’re going to offer you money, you’re going to see tax returns coming in with money; don’t be tempted to take it because if you do you’re going to end up going to jail.’"

Insensibly, every year, a handful of these employees would try to beat the system and end up paying the price. "There was one lady in particular who would change the ‘IRS’ on the payee line of checks to ‘MRS’ and then add her name and go cash them. She’d been doing that for a while while we finally caught on. We ended up arresting her. But it was creative."

After five years of being immersed in the seamy side of things and busting malefactors, John decided he had enough. Interacting with a criminal element was taking its toll, not least on his home life. "It was time — maybe past time — for a career change.

The church mission was spiritually fulfilling but it was taking its toll, not least on his home life. "It was time — maybe past time — for a career change."

In that internal debate over which career path to pursue, law enforcement ultimately won out.

Over time, as he transitioned from organizational development into an HR business partner role, his interaction with people who aren’t very ethical or honest or are not outstanding citizens, let us say, I was starting to get cynical. You start to see that side or worst in people. It really hit home when Tammy said to me one day, ‘I’m your wife, you don’t interrogate me.’ I just felt like it was having a negative influence on me even though I pride myself on not being that kind of a person. When you live in that mindset day-in and day-out it affects you."

"That job didn't last long. I liked the work but the healthcare industry didn’t resonate with him. "I worked for them for about a year and decided to leave," John recalls. "That’s when I got hired by Allied Signal, which soon acquired Honeywell and kept the Honeywell name."

He served as an internal organizational development consultant with Honeywell in Phoenix, which worked out well for him. His oldest daughter was about to start high school and John and Tammy thought it would be good to settle in one place for a while so that during high school their kids would have some consistency. "We thought that was important for them," he says. "We thought that was important for them," he says. "We thought that was important for them," he says. "We thought that was important for them," he says. "We thought that was important for them," he says. "We thought that was important for them," he says.

A valued skill set

"It was gratifying for me that they appreciated my skill set and even more gratifying that I felt like I was adding value to the company and helping the leaders I supported find success," he says. (Continued on page 8)